GOING TO INTEROP? Our guide will help you plan ahead. **PAGE 19**

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[2] HP ProLiant DL380p G8 supports up to 35°C (link: http://www.storagenetworks.com/documents/manuals/dl380p-gen8-manual.pdf). Dell PowerEdge R720 and R720xd support up to 40°C at 10% of annual operating hours or less (link: http://support.dell.com/support/edocs/systems/peR720/en/OM/r720omen.pdf).

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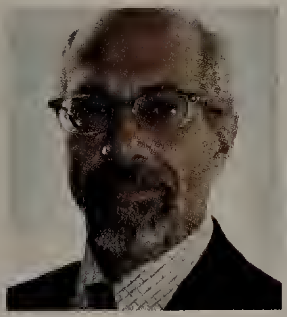
FROM THE EDITOR | JOHN DIX

Gauging BYOD acceptance

The debate about the bring-your-own-device (BYOD) movement has quieted down, mostly because, it seems, while IT has been over in the corner arguing the pros and cons, employees have been streaming into office with their shiny new toys and using them to get work done.



D'oh!

That suspicion, in fact, is verified by a new study of subscribers to *Network World* and sister publications (including *Computerworld*, *InfoWorld*, *CIO* and CITEworld .com) about the consumerization of IT.

While more than 80% of 1,600 shops surveyed said they have initiatives in place to enable use of consumer technologies at work, nearly half say these efforts are still reactive in nature. Only 33% say they have proactively stepped out in front to address the issue. That last roughly 20%? They are stubbornly trying to hold back the tide, reporting they have no initiatives underway.

The bulk of the shops (two-thirds) that allow BYOD let employees bring in and use what they want, while roughly one-fifth say they give employees an allowance to buy the tools they like.

Not surprisingly, smartphones top the list (at 60%) of the BYOD devices that IT has agreed to service and support, but laptops and tablets were right up there at 57% and 51%, respectively. Even employee-owned desktops made the list at 47%.

Perhaps the most interesting findings, however, concerned the perceived benefits that BYOD is delivering.

A whopping 35% of the shops surveyed say consumerization of IT will have a dramatic positive impact on user satisfaction over the next 12 to 18 months. Another 47% say it will have a moderately positive impact, which, taken together, means more than 80% of the IT folks surveyed see BYOD as a big win.

User productivity also scores high, with 76% saying consumerization will have a moderate or dramatic positive impact, while 70% expect the same benefit for business agility, and 69% say consumerization will dramatically or moderately improve process efficiency/collaboration.

What about revenue growth? Oddly enough, given the positive outlook about the business benefits cited above, some 56% of the shops say consumerization will have little or no impact on sales. Go figure.

When it comes to lingering doubts, security tops the list of challenges organizations are most concerned about when it comes to consumerization, followed by privacy/compliance issues, loss of control, problems tying BYOD tools to existing systems/services, and protection of intellectual property.

John A. Dix

COVER ILLUSTRATION: RICHARD DOWNS

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peersay

Ideas on improving Windows 8

NO. 1 ISSUE: Merge the desktop and Windows 8 boxes into a common interface that supports multiple active applications on the same monitor (Re: "8 ways Microsoft could improve Windows 8"; tinyurl.com/d63on64).

While it may make sense on a tablet to have each application take over the small screen, it makes no sense and is unworkable on a desktop with a 24-inch screen. I usually have 10 things running at once.

Jim_in_IT

MY ISSUE WITH several of these "improvements" is they are simply customization options. Now every Windows 8 computer I sit at might be different, and wasn't that the big gripe, that users can't find anything? And I'm tired of hearing about the Start Menu. The start screen is just fine for most users.

Tim Williamson

OpenStack still has growing to do

I WAS WATCHING Cisco's "Engineer Unplugged" podcast and a VMware and a Cisco engineer were talking cloud. The two joked about how OpenStack is a "research project" (Re: "OpenStack grows up: But is it grown-up enough for enterprise IT?" page 9).

This showed that even within one of OpenStack's biggest sponsors there's still a sense that it's not there yet for the enterprise.

VirtualizedGeek

A bunch of hardware-defined networking guys **defining SDN's future is quite ironic.**

MPLS 'myths' aren't myths

IN YOUR MODEL, I have to send my traffic across my Internet link to your hub site. That means I don't have one throat to choke if my call quality is crap or my file transfers are slow. (Re: "Knocking down MPLS myths"; tinyurl.com/bp5m7gp).

Inbound traffic management can be accomplished with QoS marking, working closely with the MPLS provider to figure out what percentages of traffic should get through. No, I don't have perfect control, but as long as my call center keeps running, I'm happy.

BTKnight

OpenDaylight skeptics are right

GREAT ARTICLE. To me, a bunch of hardware-defined networking guys defining the future of software-defined networking is quite ironic (Re: "Skepticism follows Cisco-IBM led OpenDaylight SDN consortium"; page 8).

Can it possibly lead to anything but "controlled migration" vs. real innovation? Where would we be if IBM and HP had led the charge to commercialize cloud computing rather than Google, Amazon and Rackspace? Would Dell ever have conceived the Open Compute Project?

Todd

Don't dismiss PC tech so quickly

THE REALITY FOR most users of electronics is that the market is evolutionary, not revolutionary. Technological change, although vital for progression, doesn't translate to elimination for a lot of nontechnical reasons, one being taxation and another being profits (Re: "13 PC technologies that need to disappear, stat!" tinyurl.com/cfa8tu7).

Hardware examples: remote cameras for hunters, sensors, manufacturing floor devices, photographic data converters. Even Strawberry Pi, Arduino and Beagleboard units use microSD or other form factor card readers.

Wonderful thoughts from a technologist, impractical thinking from an actual user.

DarthVaderMentor

Enterprise IT can't handle cloud tools

SURELY THE "IT department" using most of the tools mentioned is akin to the team that wires up the electronics learning how to run a nuclear power station (Re: "Cloud tools abound. Is enterprise IT ready?" tinyurl.com/d37gtgr).

Enterprise IT just needs to consume cloud services, not build them. Few enterprises have the scale to get the economies of building their own cloud. Even if they can knock together some internal cross-charging that seems to work, the fact that the cloud has to be built upfront means that there will be much wasted spend.

Mtimc

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bits

House approves CISPA over privacy objections

THE U.S. HOUSE of Representatives last week voted to approve a controversial cyberthreat information-sharing bill, despite opposition from the White House and several privacy and digital rights groups. The Cyber Intelligence Sharing and Protection Act (CISPA) would allow U.S. intelligence agencies to share cyberthreat information with private companies. It would also shield private companies that voluntarily share cyberthreat information with each other and with government agencies from privacy lawsuits brought by citizens. Privacy groups have complained CISPA would allow private companies to share a broad range of customer data with each other and with government agencies. Supporters, however, argued the legislation is needed to encourage better information sharing about active cyberattacks, resulting in better defense of U.S. networks. Before becoming law, the bill needs to be passed by the U.S. Senate before heading to President Barack Obama for his signature. The Senate declined to act on another version of CISPA during the last session of Congress, and earlier last week Obama's advisers threatened a veto, although that was before the House approved a handful of amendments intended to address privacy concerns. **tinyurl.com/cwldwna**

PARITY BITS

26%

The compound annual growth rate of public IT cloud services from 2012 to 2016, five times that of the IT industry overall.

SOURCE: IDC

Popular home routers contain critical security vulnerabilities

THIRTEEN POPULAR home and small office routers contain security problems that could allow a hacker to snoop or modify network traffic, according to new research. Independent Security Evaluators (ISE), which is a security consultancy based in Baltimore, found that all of the routers they tested could be taken over if the hacker had access credentials. The tested products came from Linksys, Belkin, Netgear, Verizon and D-Link. All of the router models evaluated ran their company's latest firmware and were tested with their default, out-of-the-box configurations. Consumers have few options for mitigating the attacks, ISE said in its report. "Successful mitigation often requires a level of sophistication and skill beyond that of the average user," ISE said. ISE advised vendors to upgrade vulnerable firmware and send registered product users upgrade instructions. **tinyurl.com/bww4v6r**

No room for fakes

TECHNOLOGY VENDORS are backing a new standard aimed at preventing counterfeit and tampered goods from polluting the IT supply chain. The Open Group's Trusted Technology Forum published the standard — a 32-page document that lays out best practices in design, sourcing, building, fulfillment and other facets of supply chain distribution — and an accreditation process for suppliers is in the works. High-tech firms and government agencies contributing to the standard include Boeing, Cisco, EMC, HP, Huawei, IBM, Juniper, Microsoft, Raytheon, the National Security Agency, the U.S. Department of Defense and NASA. **tinyurl.com/d724ylv**

Google Fiber planned for Provo, Utah

GOOGLE IS acquiring iProvo, a fiber-optic network owned by the city of Provo, Utah, as part of a plan to introduce its high-speed broadband network called Google Fiber there. As part of the acquisition, Google will upgrade the network to gigabit technology and finish network construction. Google has committed to offer free Internet service at 5Mbps speed to every home along the existing iProvo network for a $30 activation fee and no monthly charge for at least seven years. **tinyurl.com/cbqbene**

Social nets a giant time suck

AMERICANS ARE so fixated on social networks that they spend an average of 16 minutes out of every hour on forums and social networks like Facebook, Twitter and Instagram, according to a study by Experian Marketing Services. The U.S. is a bit more hooked on social networks than Internet users in the United Kingdom, who spend 13 minutes of each hour on social nets, and Australians, who spend 14 minutes per hour, Experian reports. **tinyurl.com/d3f7vfr**

Red Hat, Hortonworks prep OpenStack for Hadoop

MERGING THE worlds of big data and cloud computing, Red Hat, Hortonworks and Hadoop integrator Mirantis are jointly building a software program called Savanna that will make it easier to deploy Apache Hadoop on an OpenStack cloud service. Administrators can specify the cluster topology, the number of nodes, required hardware and other attributes. Over time, the software will offer additional functionality, such as auto-scaling, the ability to schedule when a Hadoop deployment runs, and the ability to manage multiple Hadoop clusters. "Enterprises will have a much easier way to deploy and use Hadoop at scale," said Mirantis CEO Adrian Ionel. Mirantis launched the project earlier this month, donating the code to the OpenStack Foundation. **tinyurl.com/cptlf54**

IT VIDEO

Making real Polaroids from an iPhone

Forget about Instagram for those old-timey photos. Check out this video report on Impossible, a new device that exposes images from an iPhone onto Polaroid paper for instant, paper-based pictures. *tinyurl.com/csmd7q3*

Google adds IT admin features for Chrome browser

GOOGLE HAS beefed up the administration and management controls that IT staff have over their users' Chrome browsers. One new feature allows IT to apply a workplace configuration to Chrome browsers installed on employees' home computers so users can access their work Web apps by logging in with their Google Apps for Business accounts. Google also announced a new Chrome extension that lets IT configure the browser so it will launch an older browser for certain sites and Web applications that run better with a "legacy" browser. **tinyurl.com/cb67l6g**

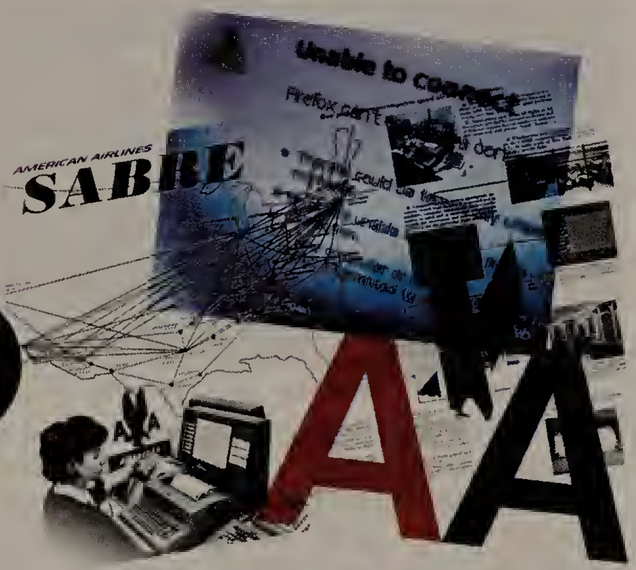
GOOD BAD UGLY

good

Beating down cloud prices

MICROSOFT LAST week said it is dropping prices for Azure Cloud Services and for Azure virtual machines to match those of Amazon Web Services and implied that it will cut the prices of other Azure offerings as well to match those of AWS. In its Windows Azure blog, the company commits to matching Amazon Web Services pricing for compute, storage and bandwidth, which translates into a cut in VM and Cloud Services prices of 21% to 33%. "If you had concerns that Windows Azure was more expensive, we're putting those concerns to rest today," a Microsoft GM wrote.

bad



American Airlines ups and downs

AMERICAN AIRLINES restored access to its reservation system on April 16 after a four-hour outage that grounded its flights across the U.S. Problems began around 11 a.m. CDT when the airline began suffering "intermittent outages" to its reservation system. American Airlines relies on Sabre for much of its reservations, but said the problem was with its system and not with Sabre's systems. Within two hours of first notifying the public of the problems, American halted its flight operations, disrupting the travel plans of tens of thousands of travelers.

ugly

Cybercrooks picking on small businesses

CYBERCRIMINALS ARE increasingly targeting small businesses due to their less sophisticated defenses, according to a new report from Symantec. Companies with 250 employees or fewer absorbed 18% of targeted cyberattacks in 2011, but the figure jumped to 31% in 2012, Symantec said in its Internet Security Threat Report 2013. "While it can be argued that the rewards of attacking a small business are less than what can be gained from a large enterprise, this is more than compensated by the fact that many small companies are typically less careful in their cyberdefenses," the report said.

Skepticism follows OpenDaylight SDN consortium

BY JIM DUFFY

IF YOU'RE skeptical about the intentions of the OpenDaylight SDN consortium, you're not alone.

Several questions remain regarding the true objectives of this consortium, pulled together by Cisco and IBM and involving several of their partner and competitor vendors in an effort, on the surface, to induce an application ecosystem for open source SDNs. Several established and startup vendors, including Cisco, IBM, HP, Juniper, Arista Networks and Big Switch Networks, are collaborating under the auspices of the Linux Foundation to develop an open source framework for SDN application development.

But there are several elephants in the room, of various sizes:

- The conspicuous absence of the user-driven Open Networking Foundation (ONF).
- Co-founder Cisco's effort to have its Cisco ONE controller as the de facto controller for OpenDaylight.
- Guarded optimism from some members, like Big Switch, that this effort stays true to its stated goals. Indeed, Big Switch's participation is as much a watchdog over the process as it is contributor.
- Cisco's downplay, and even dismissal, of the role of OpenFlow and the decoupling of control and data planes in SDNs. OpenFlow is the popular open source SDN API and protocol supported by many users and vendors.
- The likelihood that Cisco's Insieme Networks programmable networking spin-in will not include Daylight in its product development.

"We're skeptical of this effort for several reasons," says Gartner analyst Joe Skorupa. "Unlike the ONF, this effort is controlled by large vendors and has cut out the voice of the consumer.

So why should anyone view this as anything more than Cisco and IBM attempting to freeze the SDN market as they get their own products ready in the background?

"We are very cautious and even skeptical that this body will not be politicized by some vendors' behavior," Jason Matlof, vice president of marketing for Big Switch says. "We are Platinum members because we believe that the spirit of Daylight is the right thing for the industry and users, to the extent that it remains committed to standards, including OpenFlow; it delivers on the explicit expectation that the community be 'Merit-Based'; and it is open to all contributions."

OpenDaylight Project at a glance

Mission: A community-led, open, industry-supported framework, for accelerating adoption, fostering new innovation, reducing risk and creating a more transparent approach to software-defined networking.

Key members: Big Switch Networks, Brocade, Cisco, Citrix, IBM, Juniper Networks, Microsoft, Red Hat, Ericsson

Hot questions: Will OpenDaylight be truly open given the influence of Cisco and other big vendors? How strongly will user-driven Open Networking Foundation support it?

Matlof and Big Switch are concerned about Cisco's recent remarks about OpenFlow, which Big Switch believes undermines the capability of OpenFlow in SDNs. The company is also concerned that Cisco will push its own Cisco ONE controller as the de facto controller for OpenDaylight.

That concern is legitimate, according to Skorupa. "While the effort is supposed to be governed by a 'technical meritocracy' it looks to be 'pay to play' from a governance perspective," Skorupa says, referring to the tiered membership fees for participation in OpenDaylight. "Furthermore, the selection of a foundation controller that hasn't been proven from a vendor with a mixed record on new software and that has been openly critical of OpenFlow seems suspect."

Cisco is "not ready to coronate" its Cisco ONE controller as the de facto controller for OpenDaylight — but Cisco did submit it for the project and it's in the hands of 50 customers who are writing applications for it, says Dave Ward, Cisco vice president of engineering, CTO and chief architect.

"There's no momentum around one controller of all the open source controllers out there" like Floodlight, Nox, Trema and others, Ward says. "There's no reference architecture."

But it's not about the controller, Ward asserts — it's about the applications.

Without OpenDaylight "there's a chance in three to five years we're all chasing a controller," Ward says. "But all revenue comes with the applications on top. All the action is in the applications on top of a common controller."

That may be why Big Switch is so cautious about OpenDaylight: It may disrupt its business plan. Big Switch charges about $1,700 per month for its Big Switch Controller and $4,200 per month for its Big Virtual Switch.

"Most of the vendors are saying, 'Let's get together to create an OpenFlow controller,'" says Peter Christy, Networks research director at 451 Research. "Vendors don't plan to differentiate on it. They agree that they don't want to compete at some lower layer. They're doing an OpenFlow controller like they collaborate on OpenStack."

Christy says this effort could either undercut or accelerate Big Switch's business plan, but Big Switch says that's not what worries it.

"What we are contributing is overwhelmingly already free through Project Floodlight, and our business model is already largely open source," a Big Switch spokesperson states. We derive our revenue from subscription and services around the Open SDN Suite.

"We are concerned that Cisco will politicize the selection process ... and that they will begin deprecating the code to move it more toward the proprietary model that serves them and no one else, most especially customers."

That may be the ONF's concern as well. The ONF's participation, endorsement and support was missing from the OpenDaylight press release and related material, but the OpenFlow-focused organization, founded by Google, Facebook, Yahoo, Verizon and Deutsche Telekom, issued a statement upon request that it is watching Daylight and other initiatives to see how they "measure up" to openness.

The OpenDaylight work will include an attempt to standardize a northbound API from the network infrastructure to the SDN orchestration layer to aid in the programmability of the network. OpenFlow is one of the southbound network control protocols both OpenDaylight and ONF will support, but ONF passed on working on a northbound API and has no open source resources with which to attempt it, Ward says.

And while this OpenDaylight work proceeds, Cisco and the other vendors in the consortium will continue to work on their own unique SDN architectures apart from the OpenDaylight project. ■

Is OpenStack grown-up enough for enterprise IT?

BY BRANDON BUTLER

LESS THAN a year ago the cool thing for IT vendors to do was jump on the OpenStack bandwagon.

Everyone was hopping on: Red Hat, IBM and even VMware signed on as partners to the open source cloud computing platform, joining Rackspace, HP, Cisco and Dell that were already backing the project. All these companies had a unified goal, says Marc Brien, an analyst at Domicity, who tracks the movers and shakers of the cloud world. They wanted to stave off the fast-growing dominance of Amazon Web Services in the cloud.

But Brien questioned exactly how OpenStack would work out. Would Rackspace have problems relinquishing control to a newly formed OpenStack Foundation?

"It's a year later and OpenStack has such momentum that virtually all the major server-side vendors now feel the need to have a foot in the OpenStack camp and to make an effort to play nicely," he says.

Earlier this month OpenStack released the seventh iteration of its code, each one delivered on-time in the six-month cycle. The latest version, code-named Grizzly, incorporates the three major components for building a cloud — compute, storage and network — while attention has increasingly been paid to integrating the software with existing technologies and scaling it for larger deployments. Organizers, meanwhile, recently held the project's semi-annual summit in Portland, Ore., and with more than 2,600 contributors, vendors and users attending, it was more than double the size of the project's October show.

But despite all the momentum, there still seems to be a general question among regular IT folks: Is OpenStack grown up enough for enterprise IT to use it in a significant way?

Experts who follow the cloud and OpenStack specifically say yes, the platform has matured to a point where enterprises can consider using it, but with a caveat or two.

Using an open source cloud computing platform is the way to power next-generation computing, says Lew Tucker, Cisco's cloud computing vice president and co-chairman of the OpenStack Foundation. OpenStack should be the platform of choice for both public cloud service providers to build commercial cloud offerings on, and for business end users to power their own private clouds. "The enterprise naturally takes some time to understand how these new cloud platforms can be applied in traditional types of data centers," Tucker says. But OpenStack is a compilation of software components specifically designed for operating a cloud computing environment. For vendors, it allows them to leverage the work of a community of hundreds of developers. For users, OpenStack allows the potential to have the same platform for private clouds as multiple different public clouds, enabling federated hybrid clouds.

> **The enterprise naturally takes some time to understand how these new cloud platforms can be applied in traditional types of data centers.**
>
> **LEW TUCKER,** VP OF CLOUD AT CISCO, CO-CHAIRMAN OF OPENSTACK FOUNDATION BOARD OF DIRECTORS

That vision of an OpenStack-based hybrid cloud isn't quite yet reality today, but it's getting there. So far Rackspace and HP are the two big public cloud providers that have used OpenStack as the basis for their offerings, but Dell has promised to launch an OpenStack cloud of its own later this year as well.

One thing that is not lacking in the OpenStack movement is momentum and hype. "They need to turn the interest into many more enterprise users, and that's only going to come with time," says David Linthicum, senior vice president at consultancy Cloud Technology Partners. "The next two years will be critical."

A central theme hammered home during the summit was user stories. On the OpenStack web site, there are already user stories from companies like PayPal, Intel, Cisco and Mercado Libre — the eBay of Latin America.

Piston Cloud Computing Co. CTO Josh McKenty, who sits on the OpenStack Foundation board of directors, says many of his customers are jumping ship from Amazon Web Services and looking to spin up private clouds behind their own firewalls that have the look and feel of a public IaaS cloud like AWS's.

Other vendors are taking a different approach. One of the closely watched companies in the OpenStack movement has been Nebula, whose founder and CEO, Chris Kemp, served as CTO of IT at NASA where OpenStack's compute component was born. Instead of a software distribution, Nebula has created a software-hardware combination that Kemp says can be plugged in and switched on to create an OpenStack-powered IaaS cloud. A turnkey OpenStack solution has not been available on the market, that is, he says, until now.

OpenStack member companies have developed a range of use cases so far.

Some companies, like Piston, CloudScaling, SUSE and Canonical, have taken the OpenStack code and massaged it into a distribution that is sold as a pre-packaged software stack users can deploy. On the opposite side of the coin are vendors who are using OpenStack as the basis for their public cloud platform; companies like HP, Rackspace and soon Dell fit this bill.

Then there is a whole ecosystem of OpenStack member companies that are ensuring their products and services work in the OpenStack ecosystem. VMware and Microsoft, for example, have done work to ensure their hypervisors, ESX and Hyper-V, respectively, work in OpenStack clouds, which are new features in the Grizzly release.

Whatever the approach of OpenStack member companies, project backers couldn't be happier with the progress. In the fall of 2012 the Folsom release added a significant missing piece of the code — virtual networking capabilities.

The latest Grizzly release of the code is about making OpenStack scale and integrate with existing systems more easily. Users can now manage multiple OpenStack clouds through a single console; there are new drivers that ensure it is compatible with a wide range of products commonplace in the enterprise market.

The next release of the code, expected toward the end of 2013 named Havana, will bring with it some more fine-grained features, like a metering and billing service and an orchestration component for more easily managing and deploying OpenStack clouds. ■

So you want to be a data scientist?

BY MARY BRANDEL

AFTER MONTHS of high unemployment and a still-wobbly economy, any good news from the jobs market is going to get some traction. But even that doesn't seem to fully explain the attention surrounding a suddenly very "in" job title: data scientist.

According to CNN, data scientist is one of the best new jobs of 2012, and an article in the Harvard Business Review called it the "sexiest" job of the 21st century.

The allure surrounding this role is in direct correlation with the general market's interest in big data and analytics — tools of the trade for data scientists, who are tasked with unearthing meaningful correlations within ever-mounting data volumes and turning them into profitable business insights.

What's more, there is often a unicorn status imbued on people who fit this multifaceted position, which blends computer science, advanced quantitative concepts, business domain knowledge and communication skills. With demand for data scientists exceeding supply, salaries for these workers range in the six figures, according to Matthew Ripaldi, senior vice president at Modis, a staffing firm.

Recruiters also agree that the data scientist position is fast-growing, even if the number of job postings is not yet staggering. "When we started looking at this position two years ago, there were just eight postings, and now there are 42," says Tom Silver, senior vice president for North America at job search site Dice.com. "Forty-two out of 83,000 jobs is not huge, but I would suspect postings to grow even more in the future."

With all the attention, it's only natural that people with any background in data and computing might wonder, who are these people, and could I become one?

A widely accepted definition of a data scientist comes from Hilary Mason, chief scientist at Bit.ly: someone who can obtain, scrub, explore, model and interpret data.

Neil Raden, CEO at Hired Brains, goes a bit deeper, categorizing data scientists into two groups.

Type 1 are true scientists who research and create algorithms and methods, publish papers and actively participate in their discipline's communications. These individuals are found most often in research, academia and organizations, where new methods and algorithms are the core of the enterprise (think Google, Amazon, Wall Street), Raden says.

Type 2 — the group more often referred to in today's hiring market — are not scientists but practitioners, Raden continues. These are experts in statistical and mathematical modeling and development, who understand and employ quantitative methods, as well as design, test and deploy models.

Jacob Spoelstra, global head of R&D at Opera Solutions, also distinguishes between what many people broadly categorize as data scientists and the work he and others do at Opera, a provider of predictive analytics as a service.

Opera's "data scientists" — who would best fit in Raden's Type 1 category — work at the machine-learning level, developing statistical models and pattern recognition algorithms that find and extract predictive intelligence from massive data flows. They turn these findings into directed actions that help improve business by, for instance, reducing financial fraud or detecting risky mortgages. Companies like Google employ hundreds of this type of data scientist, Spoelstra estimates, and of Opera's roughly 700 employees, about one-third are machine-learning specialists.

Meanwhile, Greta Roberts, CEO at Talent Analytics Corp., believes the current understanding of the data scientist job actually encompasses four functional roles. After conducting a survey that asked data scientists to detail how much time they devoted to 11 analytics functions, four clusters emerged: data preparation professionals (who spend most of their time on data acquisition, preparation and analytics); programmers (who program and do some analytics); managers (who concentrate on data management, administration, presentation, interpretation and design); and generalists (who do a little bit of everything).

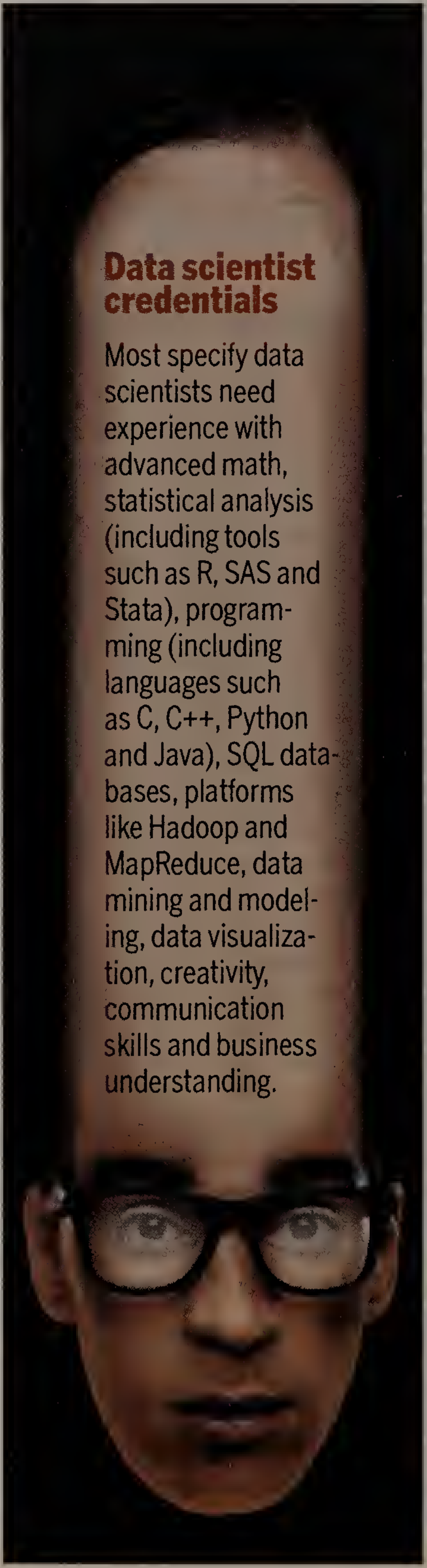
"Because it's a newer role, I think people are throwing everything in there," Roberts says. "And when you over-specify, you come up with a null set." What many businesses see as a data scientist, Roberts says, is actually a variety of functions performed by a group. And while there still may be a shortage of people to fill these roles, she says, the situation is a far cry from hunting unicorns, as plenty of people possess the natural aptitude to grow into one or more of the needed roles.

And it's true that data scientists do require skills and capabilities that are distinct from previous generations of data analysts, according to Raden. For instance, they need to be able to handle the wide variety of data available today and the resulting array of analysis that can be employed, he says.

They need programming skills, as well as a background in quantitative methods and an investigative and modeling orientation. And they must be able to discern what is and isn't meaningful when it comes to the data, Raden continues. Effective data scientists also need sufficient business domain knowledge and the ability to communicate complex subjects to others who lack background in the tools and methods employed, he says.

What pushes data scientists ahead of other analytics professionals, Ripaldi says, is the ability to communicate — often to the C-suite — what the data tells them, as well as how to act on the findings. ■

Brandel is a freelance writer. She can be reached at marybrandel@verizon.net.



Data scientist credentials

Most specify data scientists need experience with advanced math, statistical analysis (including tools such as R, SAS and Stata), programming (including languages such as C, C++, Python and Java), SQL databases, platforms like Hadoop and MapReduce, data mining and modeling, data visualization, creativity, communication skills and business understanding.

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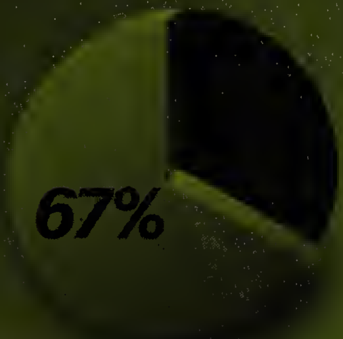

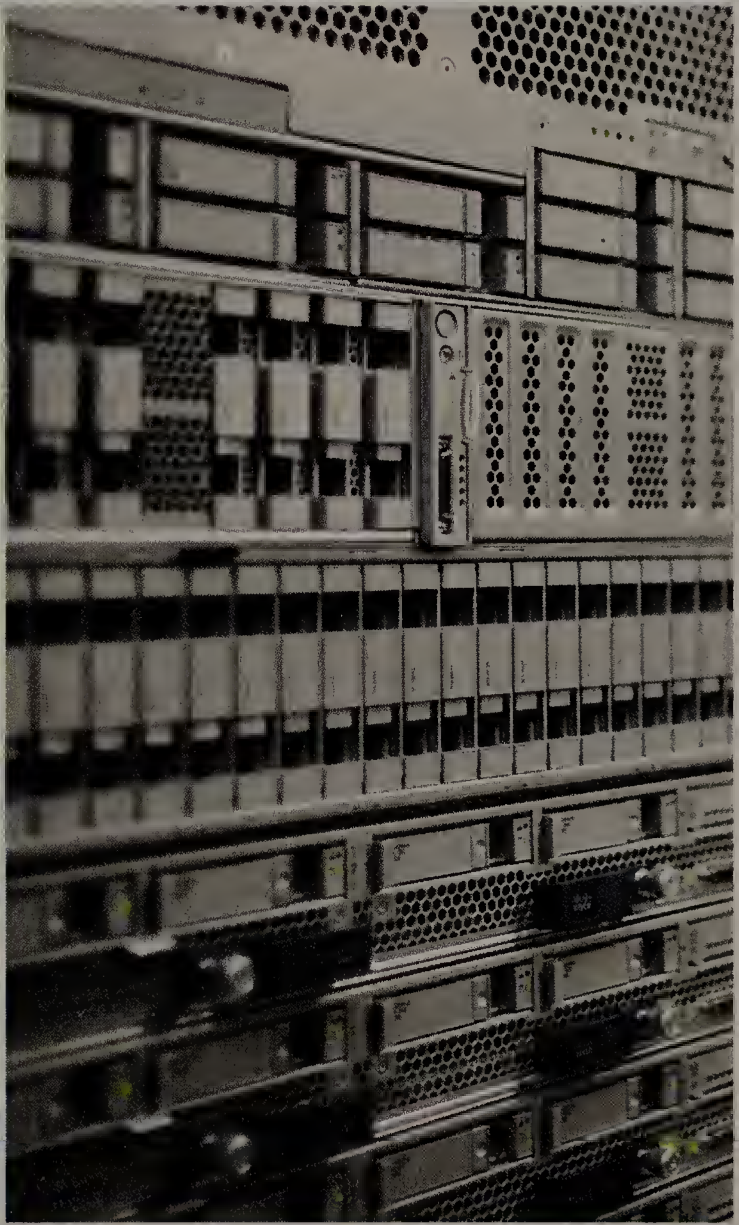

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CEO PAY TRENDS

Network World analyzed CEO pay packages at 44 tech companies and uncovered these compensation highlights.

NOTEWORTHY RAISES

Thorsten Heins

2011: **$1.9 MILLION**
2012: **$10.2 MILLION**

Heins, who was promoted to CEO in January 2012, netted a fivefold pay increase in BlackBerry's 2012 fiscal year (ended March 3, 2012).

Michael Dell

2011: **$4.3 MILLION**
2012: **$16.1 MILLION**

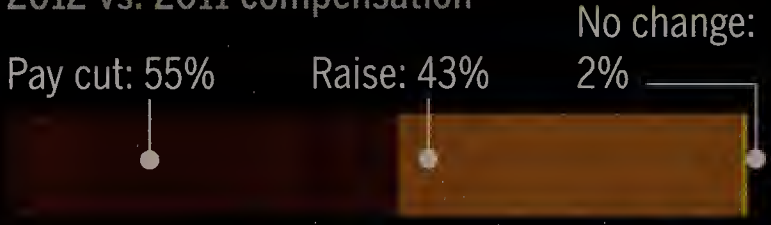
Thanks to stock and option awards, Michael Dell's total compensation gained $11.8 million in 2012. A year earlier, Dell's CEO didn't receive any equity awards.

MEDIAN COMPENSATION

$10.7 MILLION

PAY CUTS OUTNUMBER RAISES

2012 vs. 2011 compensation



LOWEST PAID TECH CEO

Steve Ballmer, Microsoft CEO

TOTAL COMPENSATION

$1.3 MILLION

BIGGEST PAY SWING

2011: **$378 MILLION**
2012: **$4.2 MILLION**

Apple granted CEO Tim Cook a $376 million "promotion and retention award" in 2011, but there was no such stock award in fiscal 2012, when Cook's pay package settled in at $4.2 million.

BIGGEST CASH BONUS

Brian Roberts, Comcast CEO

$9 MILLION

HIGHEST PAID TECH CEO

Larry Ellison, Oracle CEO

Ellison's total compensation climbed 24% in 2012, up from $77.6 million in 2011. The bulk of his pay package came from equity awards valued at $90.7 million.

TOTAL COMPENSATION

$96.1 MILLION

5X
FASTER DEPLOYMENT

68%
LOWER COST PER USER

83X
HIGHER AVAILABILITY

THE NUMBERS ADD UP.
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What's next for Virtual Instruments?

BY BOB BROWN

CEO JOHN Thompson, who during 42 years in the tech industry has led Symantec and held high-level positions at IBM, says Virtual Instruments isn't trying to win a popularity contest. It's focused on helping customers make what Thompson says he believes is the inevitable transition from physical to virtual to cloud-based infrastructure. "Would you have had the same degree of ambivalence about CA or VMware years ago? The day I announced I was leaving IBM to go to Symantec, the guy I was working for said, 'Who?' I bet the world knows who Symantec is today. ... If we're as successful as I think we'll be, maybe in five years a lot more people will know Virtual Instruments, too."

Fun Facts

CEO John Thompson once owned a chunk of the NBA's Golden State Warriors.

HE WAS ALSO WIDELY REPORTED TO BE ON **PRESIDENT BARACK OBAMA'S SHORT LIST** FOR **SECRETARY** OF **COMMERCE DURING** HIS FIRST TERM IN OFFICE.

The company picks a movie-based theme for its annual Sales Kick Off event each year. "Transformers" and "The Matrix" have been among the choices.

FOR APRIL FOOLS' DAY, **EMPLOYEES STUFFED** THE **VP OF ENGINEERING'S OFFICE WITH BALLOONS.**

Many people at first think the company is in the music business because o[illegible]

By all accounts the company is headed in the right direction, growing its customer base and revenue on average 80% to 90% a year (with average deal sizes of $200,000 to $300,000 among mostly Global 2000 organizations) and possibly even filing to go public within the next 12 months. Virtual Instruments is a private equity carve-out from a company called Finisar best known for its optical networking technology. Virtual Instruments has raised nearly $70 million in venture funding in an increasingly enterprise IT-friendly investing climate, most recently snagging $27.5 million last fall to help fuel product development. Thompson says Virtual Instruments is chasing a $9 billion market opportunity for software and hardware probes and related offerings.

Virtual Instruments vs. the world

Thompson says his 250-member team — including 60 in engineering — feels good about its progress but also has a long way to go. "We've defined a new category called infrastructure performance management, and interestingly enough all the big boys (CA, IBM, etc.) claim they do it, too. We've got to run a bit harder to make sure we don't get caught."

Virtual Instruments gets especially feisty toward Brocade, which has suggested that third-party tools such as those from VI might not be needed thanks to its new Fibre Channel SAN switch management software. Thompson argues that Brocade might be able to do what Virtual Instruments can do for Brocade switches, but not for servers and arrays. "They'll be able to do one component of what we do, but not the totality of it. As customers become more cognizant of that, they'll challenge and question ... Brocade's sanity."

As for Cisco, Thompson says he gets along well with the switch/router giant's CEO John Chambers, but hasn't yet been able to convince Cisco that there's value in working closely with Virtual Instruments. "They clearly would like to own more of the component parts around their infrastructure ... they're focused on the server," Thompson says. "Interestingly enough, they are part of VCE [along with EMC, VMware, Intel] and we are VCE-certified, so VCE recognizes that our platform has value into that converged stack. So we'll meet [Cisco] in the marketplace, customers will drive demand for our technology and ultimately, if we're as successful as I think we can be, they'll eventually capitulate."

Meanwhile, other companies such as VMware are customers of Virtual Instruments' VirtualWisdom technology, but also could compete. "Everyone who plays in the infrastructure and data center space are going to be a competitor around [market] messaging. If you look at what VMware says today, there's not a problem in the data center that they're not going to solve ... but customers have problems they need to solve today and they're not going to wait for time immemorial. I give VMware enormous credit for what they've done, but they're not quite where we're at in infrastructure management."

SDN: Dodging the buzzword

Regarding SDN, Thompson says VI would rather not "cloak itself in the new jargon" and instead keep its focus on cloud-enabling customers' organizations.

But Thompson does see a need for rapid provisioning of network resources to create more agility for enterprises (the sort of capabilities associated with SDN), and says this would benefit Virtual Instruments by introducing another layer of abstraction. "The more layers of abstraction and more complexity you put in the infrastructure, we're happy about that."

While cloud computing itself might be described as similarly jargonish to SDN, Thompson does see customers moving to private clouds this year and next to become more agile and to safeguard data that they don't want to trust to public clouds. He sees small companies like Virtual Instruments completely availing themselves of public clouds, using services such as Salesforce.com and Microsoft Office 365.

On the road for the past couple of weeks visiting customers (including CIOs, vice presidents of infrastructure and operations executives), Thompson says he's had a good view into the challenges IT staffs are facing in terms of changing job responsibilities brought about by virtualization and cloud computing.

"More and more of the complex environments that have historically organized by server, network, storage are now realizing they have a systems problem, not a component problem, and to solve the systems problem they need to put people in place who think about capacity and performance. What's the capacity of the infrastructure I've built and how do I manage the performance of it such that it's not solely about provisioning new devices but is as much about optimizing the mix of where workloads live?" he says. "We've seen a number of customers put new organizations in place to try to organize horizontally as opposed to by vertical stacks." ■

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When it comes to enterprise security is it better to focus on compliance or risk?

A CIO once quipped, "Security isn't hard; compliance is." And in fact, many companies focus their security efforts on meeting compliance requirements. But if you are audit-compliant, have you really addressed all of your risks, or are you just kidding yourself? Is it better to focus on the risks, presuming that doing so will cover you off on the compliance side? *Network World* Editor in Chief John Dix asked Christian Anschuetz, CIO of Underwriters Laboratories, to share his opinion.

CHRISTIAN ANSCHUETZ,
CIO, Underwriters Laboratories

History aptly illustrates that great losses can occur even when an organization is fully compliant with the necessary laws and regulations.

When the Titanic disappeared beneath the waves with more than 1,500 souls aboard, the captain and crew had complied with the most important rules guiding their conduct. The Titanic had, for example, precisely the number of lifeboats the law required, but sadly far too few to save the lives of all the passengers on the doomed liner.

What was proven true then is still true today; namely, that simply complying with laws and regulations without considering a broader perspective of the perils present in this uncertain world can result in the sinking of even the most promising endeavor.

Certainly there must be a balance between compliance and risk. Both are necessary. But ensuring compliance should represent an organization's starting point, not the endgame. Although firms must meet the appropriate regulatory standards in order to simply conduct business, this action might not be enough to truly protect its interests and workforce.

As a firm grows and matures it quickly begins to realize that most regulations only represent the absolute minimum standard that must be adopted, and stopping there exposes the firm to unnecessary potential harm. OSHA standards, for example, detail the minimum legal requirements that firms must follow to protect its workers, but there is risk to a company when an optimal level of employee safety is not addressed and integrated into the cultural fabric of an organization.

Moving from a compliance mindset to one focused on managing and mitigating risk can be difficult, but is important and necessary in this dynamic and often dangerous world. Compliance, which is the act of ensuring conformance with stated requirements (laws, regulations, contracts, strategies and policies), is second nature to most firms. It represents the "rules of the road." As good citizens, we are accustomed to following the rules. But to manage risk? Well, that involves dealing with something less obvious, less concrete and substantial; it requires a whole new way of thinking.

Risk management involves the identification, analysis and, where necessary, response plans to appropriately address situations that might adversely affect the realization of a firm's objectives and is tailored to the exact nature of the organization's business. Using this framework, a wide variety of risks are typically addressed, including technology risks, information security risks, commercial and financial risks, and even regulatory compliance risks. As such, a proper risk management practice addresses not only the complex identification of what could go wrong, but also will include the risks of noncompliance.

Both risk management and compliance are essential, and firms that merge, balance and manage the overlap between the two are most likely to avoid the biggest and most dangerous obstacles to their existence.

Complying with OSHA may very well protect a worker from the hazard of trips and falls and protect a firm from noncompliance fines and/or other sanctions, but to create a truly safety-minded culture a company needs to embrace and integrate safety practices into the very core of its business.

A company may likewise be in compliance with data privacy laws; however, without explicit education and process in place to protect its key information, it can suffer massive brand damage. In this situation, an exemplary risk management practice would ensure that data privacy standards were adhered to and, based on the specific risk to the corporation of data breaches, would have created restrictions and response plans to address other potential hazards, such as members of its workforce employing social media tools in an inappropriate, or at least unexpected, manner.

As mentioned, noncompliance itself is a risk. The cost of getting compliance wrong today can be staggering. Whether it is the UCLA Health System paying $865,000 for alleged violations of HIPAA's privacy and security rules, or Visa's suit against Genesco for $13 million in fines for noncompliance with the payment card industry data security standards, barely a day passes where we don't read about a hefty fine levied against a firm that ran amok of laws and regulations. Risk management should consider compliance its own risk category, much like credit or market risk.

Regardless of what position a firm takes on the relative importance of risk management vs. compliance, the notion of "checkbox compliance" will never sufficiently protect a firm from the many hazards it encounters. Mere "checkbox compliance" does not come close to equaling true risk mitigation. Had the captain of the Titanic taken a risk-based approach to his last voyage rather than a myopic focus on compliance, history would have recorded a far different outcome. ■

UL is a global independent safety science company with more than a century of expertise innovating safety solutions from the public adoption of electricity to new breakthroughs in sustainability, renewable energy and nanotechnology.

TOOLS

Logitech Broadcaster Wi-Fi Webcam: Outstanding portable video

Considering the enormous webcam market and the number of products available it's hard to believe that anyone could come up with anything new, novel and useful but, impressively, that's just what Logitech has managed to do with its Broadcaster Wi-Fi Webcam, a really well-designed webcam for OS X and iOS only.

Mark Gibbs' Gearhead

The Broadcaster is an HD 720p camera that has a 3x digital zoom and digital pan and tilt, a built-in mono mic with an external mic jack, and can be powered by a USB power supply or by an internal two-hour battery. It also has a built-in illumination lamp and can also shoot at 320x240 and 640x480 resolutions.

The Broadcaster comes in a slick case where the lid has a magnetic depression that mates with the bulge on the bottom of the camera, turning the case into a stand. The lid also has a standard tripod screw thread on its underside.

The camera setup procedure is clever: Using the free app you specify the Wi-Fi network details (SSID and password) and the app then displays a QR code. You point the camera at the displayed code, press the big button on the top of the camera, and the code is scanned and tells the camera how to configure itself! The same technique is used to reconfigure or reset the camera. Brilliant!

Once the camera is set up, on power-up it will automatically connect to your network and can be found by the free Logitech app you're using. The top face of the camera has a battery level indicator, Wi-Fi connection and signal strength indicators, and that large button that not only configures the camera but also triggers the connected app to record. Video can be stored locally on the device or streamed to Ustream, depending on what you've configured the app to do.

The iOS app is very good on the iPhone, iPod Touch and iPad, but it's the OS X version that's really cool because it shows you the host's built-in iSight camera as well as the Broadcaster camera at the same time. You can record from either or from both sources simultaneously and, in the latter case, the app will create two separate video files in QuickTime (.mov) format. These files will, of course, be in perfect sync and suitable for editing into a single video using the software of your choice. This makes it really easy to present subjects like product reviews or interviews where you want to cut back and forth between two viewpoints.

The fact that the Broadcaster is so small (roughly 5 inches by 2 inches by 1 inch), Wi-Fi connected, portable and has a decent battery life makes it a great tool not only for presentations but also for documenting anything that's hard to get at or to.

Logitech's Broadcaster is a great tool for presentations.

In fact, using the Broadcaster with a device like the Globalgig Hotspot which I discussed a couple of weeks ago, or the Seagate Wireless Plus, you could use the resulting mobile, battery-powered local Wi-Fi hotspot and your i-device to record video more or less anywhere.

During testing I found no major problems with the Broadcaster other than if you should, as I did, try to use the camera with an iPad, then an iPhone, then an iMac, then back to the iPhone, ad nauseam, it can be hard to get the camera to connect with each new device in turn without power cycling. As this isn't something that normal users do, it's excusable, though I'd hope to see this remedied in a future release.

What does need fixing — though these aren't deal breakers — is the zoom, tilt and pan functionality; these are slow to respond and "jump" rather than slide smoothly. I'd also like to see the iOS apps able to switch between the built-in cameras and the Broadcaster video stream as well as support for services other than Ustream (such as Livestream and Justin.tv). I'd also like to be able to capture the Broadcaster output on Windows and network attached devices such as IP video recorders.

Bottom line: Given the great design and what the product offers for $199, the Logitech Broadcaster Wi-Fi Webcam gets a Gearhead rating of 5 out of 5. ■

Gibbs is not streaming currently from Ventura, Calif. Show your stuff to gearhead@gibbs.com and follow him on Twitter and App.net (@quistuipater).

GADGETS

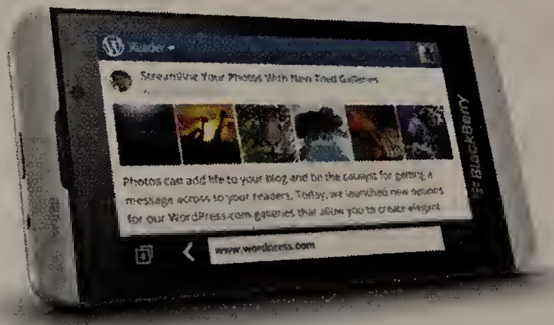
BlackBerry fans should like the Z10; not sure about other smartphone fans

Keith Shaw's Cool Tools

THE SCOOP

Verizon Wireless BlackBerry Z10

by Verizon Wireless and BlackBerry, about $200 (with two-year agreement and data service costs)



▶ **What it is:** A BlackBerry smartphone with its new BlackBerry 10 operating system that also runs on Verizon Wireless' 4G LTE network. The Z10 model is also available through other phone carriers, although the Verizon model has the unique white frame and backing.

What's new about the Z10, in addition to the new OS, is that it has no physical keyboard, the stalwart feature on BlackBerry devices for years. Instead, the phone falls more in line with competitors' smartphones, such as the iPhone 5 or Samsung Galaxy S III (and soon-to-come Galaxy S 4). This means colorful icons on the touchscreen, swipe gestures to move between menus or in and out of apps, and two-finger zoom functionality.

On the hardware side, the Z10 features an 8-megapixel rear camera/camcorder with 5x digital zoom and LED flash, a 2-megapixel front camera with 3x digital zoom (although I couldn't locate any webchat app), a 4.2-inch LCD screen, 1.5GHz dual-core processor from Qualcomm (the Snapdragon platform) and 2GB of RAM.

▶ **Why it's cool:** The hardware features make it comparable to other smartphones on the market, and the swipe gestures and icons make this more enjoyable than previous BlackBerry devices I've used. But as a longtime Android and iPhone user, I'm used to several of these functions. It might be more appealing to longtime BlackBerry fans who haven't experienced these yet, although I also wonder whether they're waiting for the Q10 model, which will feature a physical keyboard instead of the on-screen one.

On the software side, I was impressed with some of BlackBerry's video apps (Story Maker, for example) and the camera feature (Time Shift) that takes multiple photos of a person in order to line up the perfect shot. This is perfect for taking group photos (especially with two or more children in them), helping to prevent shots where one person is blinking.

▶ **Some caveats:** A smaller number of apps in the BlackBerry World app store (at least compared with Google Play or the Apple App Store) limits the flexibility of the device. For example, I couldn't find a good Internet speed test app for the Z10 in order to test the speed of the 4G LTE network — any speed test apps available were poorly reviewed or didn't work when I tried them. It doesn't feel like there's enough to make Android or iPhone users want to switch their phones to the Z10, and again, BlackBerry fans who want to stay within the family may prefer to switch to the Q10 with its physical keyboard.

Some of the device's other unique features, such as BlackBerry Hub (all your messages and social media updates in one place) or BlackBerry Balance (keep work and personal data separate) didn't jump out as appealing to me.

▶ **Bottom line:** If you're a BlackBerry diehard who is willing to move to the on-screen keyboard, the Z10 can become your new device without too much of a difficult transition. Other smartphone users are likely to stay with their preferred choice, especially as newer models (Galaxy S 4, next iPhone) come out later this year.

▶ **Grade ★★★½ (out of five).**

Shaw can be reached at kshaw@nww.com. Follow him on Twitter: @shawkeith.

Parity Bits

1 out of 7

The number of dollars spent on cloud-based software, server and storage by 2015.

SOURCE: IDC

2013 PLANNING GUIDE

INTEROP

YOUR GUIDE TO THE BIG SHOW

Interop, May 6-10 at Mandalay Bay Convention Center in Las Vegas, is set to focus on cloud, big data, collaboration, security, mobility, networking

BY BRANDON BUTLER

It's that time of the year again: Interop is almost here. With all of the changes going on in IT, this year's conference is as important as ever. From the future of software-defined networking, to the emerging use cases around cloud computing, to the ever-persistent issues around security and newfound challenges of managing mobile devices, Interop is the place to be for IT managers.

Held at the Mandalay Bay Convention Center in Las Vegas, the show officially kicks off on Monday and Tuesday (May 6 and 7) with full-day workshops on a variety of topics, including a first-ever two-day Mac & iOS IT Conference, a two-day cloud summit focusing on public and

private cloud deployments, workshops detailing how to build out a unified communications platform and other sessions on security and software-defined networking (SDN), among others.

The heart of Interop runs from Wednesday through Friday morning when keynote presenters from companies such as Facebook, PayPal, Cisco, Juniper Networks and Brocade discuss the latest in networking, data center hardware design and security. Dozens of sessions fill up the jam-packed days of the conference, with topics on nine tracks including: applications, business of IT, cloud computing/big data, collaboration, data center/storage, mobility, networking, risk management/information security and virtualization. An expo with hundreds of vendors displaying their latest products and services runs from May 7-9.

With so many potential sessions to attend, booths to visit and connections to be made, *Network World* has gone through the entire program to recommend some highlights we hope are worth checking out at this year's show. To do some research yourself and to view the full schedule, check out the Interop http://www.interop.com/lasvegas/ website.

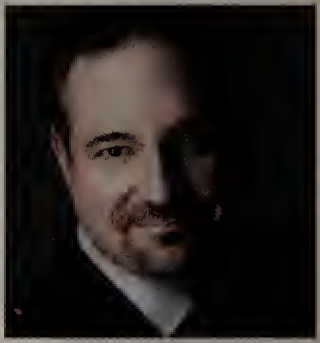
See you in Vegas!

Monday, May 6

8:30 A.M. TO 4:30 P.M.

Enterprise Cloud Summit: Platforms

If you're pursuing a cloud strategy in your enterprise, this is the workshop to be at. While the cloud can be somewhat of a nebulous term, at the end of the day it's about making organizations more efficient and agile. This session will help you understand the platforms for public and private clouds and how to deploy them.



DAVID LINTHICUM,
Cloud Technology Partners

PANELISTS > David Linthicum, Cloud Technology Partners (instructor); **Thirunavukkarasu Suresh,** product marketing, Cisco; **Peder Ulander,** product marketing, Citrix; **Rob Craft,** director of cloud, Microsoft; **Dan Baigent,** business development, HP Cloud Services.

OTHER MONDAY WORKSHOPS INCLUDE

BYOD, Mobile Security and Mobile Device Management; Financial Management skills for the Technical Manager, and the Mac & iOS IT Conference.

Tuesday, May 7

8:30 A.M. TO 4:30 P.M.

What is Software Defined Networking and What Impact Will it Have on Your Network?

The future of networking will be software-defined. To get a glimpse into this new world, these series of sessions will tell you everything you need to know about SDNs. From the basic questions of what is an SDN, why should you care about it and what you should do about it, to an overview of the Open Network Foundation and the role of open source, as well as discussions about securing SDNs and perspectives from vendors. This definitive, daylong event will tell you everything you need to know about SDNs.

JIM METZLER,
Ashton Metzler
& Associates

PANELISTS > Jim Metzler, Ashton Metzler & Associates (Instructor), with speakers form Cisco, HP, Extreme Networks, VMware and Broadcom, and analyst **Jim Frey** from Enterprise Management Associates.

OTHER TUESDAY WORKSHOPS INCLUDE

Big Data Myths and Real Decisions; Enterprise Cloud Summit: Private Clouds; Mac & iOS Conference Day 2.

FRANK FRANKOVESKY,
VP of hardware design and supply chain, Facebook; member, Open Compute Project

Wednesday, May 8

PICK OF THE DAY

8:30 A.M. TO 10:15 A.M.

Keynotes

The first general sessions of Interop kick off on Wednesday morning with three power-packed keynote speeches, including from **Frank Frankovsky,** VP of hardware design and engineering at Facebook. In addition to his duties managing the infrastructure at the biggest social media company in the world, Frankovsky has also been instrumental in launching and growing the Open Compute Project, a community-based approach to building technical hardware infrastructure with

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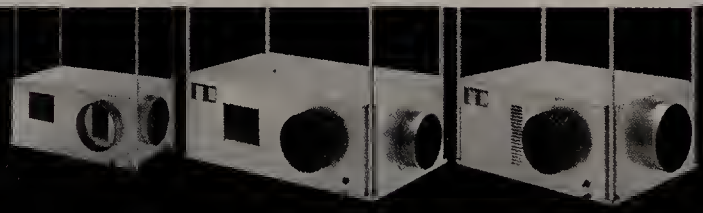

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commodity and open source components, instead of using proprietary, prepackaged vendor solutions. During his speech hear how Facebook has used this philosophy to reduce energy by 38% and costs by 24% in one of the company's newest data centers, and find out how enterprise customers can incorporate this strategy into their shops.

OTHER KEYNOTE SPEAKERS INCLUDE

Robert Soderbery, SVP and GM of Cisco's enterprise networking group, who will discuss how networking can become more intelligent, context-aware, programmable and agile, while **Bob Mulgia,** EVP of Juniper Networks' Software Solutions Group, will talk about the principles of the software-defined network (SDN) and steps toward embracing an SDN strategy.

10:15 A.M.

Business Interoperability

Interop got its roots as a conference discussing interoperability – a topic that is just as relevant today as ever. Security, disaster recovery and compliance all have to be integrated with next-generation tools like the cloud, and software-defined networks. Hear how to do it.

PRESENTER: Francis Rabuck, Director/former CTO, Real Time Asset Labs at Bentley Systems.

10:15 A.M.

Softening the Network: Virtualization's final frontier

Compute and storage have been virtualized, and now it's time for the network to catch up. Hear about the driving factors for software-defined networks and how they can be integrated into existing networks.

SPEAKER: Steve Riley, technical leader, Riverbed Technology.

11:30 A.M.

The Future of Data Centers

Data centers are at the heart of IT operations, but they're changing quickly. Hear how some of the leading technology companies are building their next-generation data centers and learn how you can operate your own data center more efficiently at scale.

PRESENTERS: Mark Thiele, executive VP of data center technology, Switch; **Ron Vokoun,** JE Dunn Construction.

2:30 P.M.

The State of the SDN, OpenFlow and ONF Movement

Since 2011 the Open Network Foundation (ONF) has been working to advance the commercialization and adoption of software defined networking. Hear an update on the roadmap from the organization's executive director.

PRESENTER: Dan Pitt, executive director of the Open Network Foundation.

2:30 P.M.

The Social/Collaboration Marketplace in 2013

Many organizations are implementing, or considering bringing onboard, enterprisewide social collaboration platforms. But with such a broad market, who are the leading players, what are their pros and cons and what is the real value this technology brings?

PRESENTER: Tony Byrne, president of collaboration research firm Real Story Group.

3:45 P.M.

Lessons Learned on the Road from Server Virtualization to Private Cloud

If you're humbled by the notion of moving from a virtualized environment to a private or hybrid cloud, hear how some users have already made this journey and what they've learned along the way.

PANELISTS: Moderator: Barb Goldworm, chief analyst, FOCUS; **Scott Hammond,** VP of strategy, Cisco; **Mohammed Abdula,** director, SmartCloud Strategy, IBM; **Jay Litkey,** Embotics, **Mike Leeper,** director of global technology, Columbia Sportswear.

3:45 P.M.

IPv6: It's High Time to Get Started

IPv6, the new Internet Protocol for Web addresses, is here and here to stay. But what does it mean for enterprise IT shops today and how should IT managers consider this new wave moving forward?

SPEAKER: Ivan Pepelnjak, chief technology adviser, NIL Data Communications.

Thursday, May 9

PICK OF THE DAY

8:30 A.M. TO 10:15 A.M.

Keynotes

MICHAEL BARRETT, chief information security officer, PayPal

The death of password!? That's the title of the keynote speech set to be delivered by someone who knows a thing or two about security and authentication: **Michael Barrett,** chief information security officer for PayPal, the online payment platform. Barrett will discuss the newest strategies for fixing the old problem of authentication via passwords.

OTHER KEYNOTE SPEAKERS INCLUDE

Enterprise Cloud Summit Panel discussion hosted by cloud analyst **Alistair Croll,** founder of CloudOps Research, featuring **Steve Shalita,** VP of marketing for NetScout Systems and **John Considine,** CTO of Terremark, the cloud computing division of Verizon. **Rajiv Ramaswami,** EVP and GM of Broadcom's infrastructure and networking group will also speak during Thursday morning's keynote addresses.

10:15 A.M.

Network Monitoring Fabrics: Decision Points

Packet-based monitoring is on the rise, but with these new tools for managing and securing the IT environment come questions about implementation: Use fixed appliances or chassis-based? How are these systems integrated and automated?

SPEAKERS: Moderator: Jim Frey, managing research director, Enterprise Management Associates; **Ran Nahmias,** Net Optics; **Huy Nguyen,** Gigamon; **Mo Rozenhart,** Ixia; **Ahmed Abdelhalim,** NetScout Systems; **Doug Gourlay,** Arista Networks.

11:30 A.M.

Strategic Staffing: Winning the War for Talent

The heart of any IT team is its people. But getting the right talent with the right skill sets is a challenge today. Learn how to handle vacant positions, where to find new recruits and what skills organizations are looking for.

PANELISTS: Moderator: Cinda Daly, director of content, HDI; **Mary Cruse,** First American Title; **Brian Fox,** CompuCom; **John Reed,** Robert Half Technology.

2:30 P.M.

The Great Debate: Managing Mobile Applications and Data

The advent of the bring your own device (BYOD) phenomenon has opened up a whole new can of worms for IT managers. This session explores the challenges, and some potential solutions, for managing a BYOD environment.

PANELISTS: Moderator: Chris Hazelton, research director, 451 Research; **Ahmed Datoo,** Mobile Platforms Group; **Tony Kueh,** SAP; **Ryan Kalember,** WatchDox; **Tyler Lessard,** FixMo; **Srinivas Krishnamurti,** VMware.

3:45 P.M.

Wireless Everywhere: LTE and Beyond

Wireless is exploding. Come to this session to learn about the dramatic changes in the wireless wide-area network, including the deployment of LTE, metered data plans and Wi-Fi offload.

SPEAKER: Peter Rysavy, president, Rysavy Research.

Friday, May 10

9 A.M.

Desktop Virtualization: Getting it right from the start

Whether you're just getting started with a virtual desktop deployment or just thinking about it, this panel will discuss the pros and cons, as well as the do's and don'ts of how to execute the right VDI strategy.

SPEAKER: Tyler Rohrer, Liquidware Labs

10:15 A.M.

Big Data 2013

JEREMY EDBERG,
Netflix

Big data is a big deal. During this session, Netflix's reliability architect discusses the latest trends in big data management tools, examples of how big data is being used, and advice on how to implement a strategy yourself to manage all that data.

SPEAKER: Jeremy Edberg, Netflix

11:30 A.M.

Addressing Persistent Challenges in the Cloud

We've all heard the benefits of cloud computing: efficiency, agility, off-loading management ... but deploying a cloud strategy is easier said than done. Hear how to overcome the most common roadblocks to implementing cloud in your IT operations.

SPEAKERS: Paul Burns, analyst, Neovise; **Azmir Mohamed,** product management, Cloudscaling.

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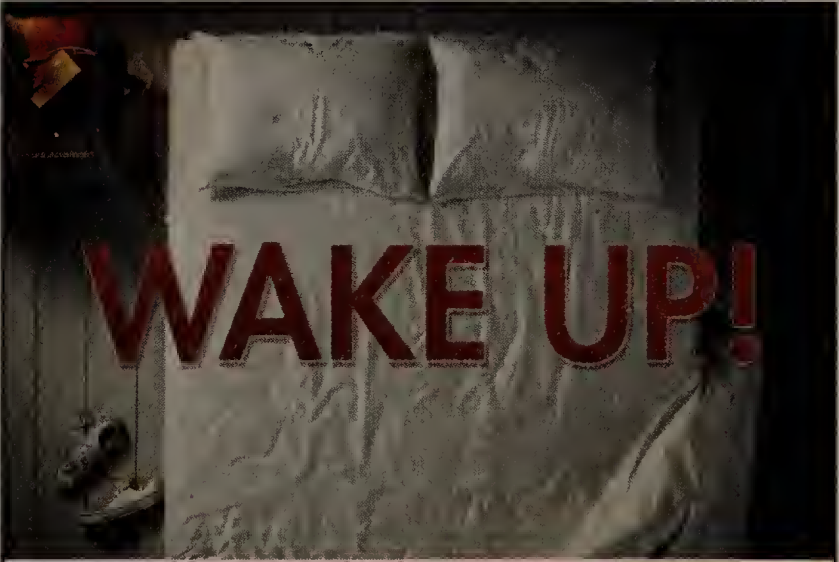

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SSL VPNS

Cisco edges F5 in SSL VPN shootout

WatchGuard, Barracuda, Dell SonicWall also deliver impressive features

BY SUSAN PERSCHKE

CLEAR CHOICE TEST

Connecting remotely to network servers is a fact of life for millions of end users. Whether working from a PC or a mobile device, users rely on secure, reliable remote connections to maintain their productivity.

We tested five products that deliver remote SSL/VPN connectivity: WatchGuard SSL 560, Barracuda SSL VPN 380, Dell SonicWall EX7000, F5 Networks BIG-IP Edge Gateway 3900 Platform and Cisco ASA 5515-X security appliance.

We found each of these products to be capable, fully mature and established in the marketplace, which made it a bit of a challenge to choose a winner. Our top pick, the Cisco ASA 5515-X security appliance, narrowly edged out the competition. While it didn't dominate in every category, the Cisco ASA 5515-X won top billing due to its rich feature set, powerful and granular configuration options and overall balance of capacity and features.

The other four products were essentially all runners-up, each with unique features that make them suitable for implementation, depending upon individual remote connectivity requirements. The SonicWall EX7000 and F5 BIG-IP appliances are higher capacity units that can handle up to 5,000 and 60,000 concurrent users respectively.

The Barracuda SSL VPN 380 and WatchGuard SSL 560 fall more into the midrange with the ability to handle concurrent users in the hundreds. Beyond capacity, choosing an SSL VPN solution is largely a matter of matching features to remote connectivity requirements.

The SonicWall EX7000 maintained a slight edge in endpoint control and logging features, while the Barracuda SSL VPN 380 proved to be more capable in creating resources and displaying system status. Both products offer an efficient Web admin interface that streamlines administration tasks.

The WatchGuard SSL 560 had a somewhat dated interface and lacked the ability to dynamically link to external directories, for example, Active Directory and LDAP. On the other hand, setup and deployment was a breeze. The WatchGuard SSL 560 is truly a "no fuss" solution that is ready to roll right out of the box — very appealing for any shop needing to get up and running quickly.

The F5 has a lot of firepower and features, but we found configuration to be an arduous task compared to the competition. Configuring the F5 unit was time-consuming and sometimes cumbersome, even with the use of built-in wizards. On the plus side, the F5 appliance has an impressive client interface and excellent reporting capabilities. Did we mention mind-boggling capacity and throughput?

How we did it

We set out to test several scenarios: access to a remote LAN including file shares, remote desktop, internal Web resources and applications, as well as the basic mobile capabilities of each product. Some of the appliances tested were primarily SSL VPN solutions whereas others include additional features such as firewall, antivirus and network accelerators. Generally speaking, the more features, the steeper the learning curve, but this is only logical.

Our main focus was remote connectivity for end users. We were able to successfully create client connections to remote networks and network resources using the access methods provided with each product. Product differences came down to features, such as the granularity and flexibility of access control, together with administration capabilities and ease-of-use/deployment.

We did not evaluate performance as this involves too many parameters that can vary widely in production environments. However, we found performance acceptable and consistent across the products tested in our lab.

Here are the individual reviews:

WatchGuard SSL 560

We hooked this unit up to a server via Ethernet ports and performed the basic setup in just a few minutes using the quick start guide. The Web admin interface is not the most sophisticated, but navigation is intuitive and relies on simple wizards to perform common tasks such as adding users and creating resource access rules.

Users are authenticated against a built-in database, as the WatchGuard SSL 560 does not have the ability to dynamically link to an external directory. However, you can use an external directory such as Active Directory, OpenLDAP or Novell eDirectory to create users or you can import a file containing usernames. When linking to an external directory you will need to synchronize changes made to the external directory by using a refresh tool.

Using the aforementioned wizards we quickly and easily created users and configured network resources. Next we checked out the client interface. After logging in, the remote user is presented with a choice of authentication methods: SSL password, SSL challenge, mobile text, SSL Synchronized or SSL Web.

Resources can be accessed via tunnel or Web resource — the tunnel resource can be a full tunnel to a local network or one with more limited access, such as a home directory, file share or Outlook Client.

Examples of available Web resources are Microsoft SharePoint, Outlook Web Access, ActiveSync or other internal Web resources. Once a resource has been selected, a built-in wizard can be used to configure the details and to set up rules to determine who has access to that resource.

We also tested access from an iOS device and found the mobile app easy to navigate with the up and down scroll only, as well as mobile-appropriate fonts and buttons.

This appliance does provide some endpoint control for Windows clients in ensuring that certain criteria are met before access is allowed. The WatchGuard SSL 560 doesn't provide any built-in rules, but rules can be created to enforce access prerequisites, such as an application (e.g., antivirus software), or for the existence of a registry key or file.

The reporting and logging capabilities of the WatchGuard SSL 560 are adequate with several built-in reports and some customization options such as date range and basic filtering. Reports can be exported to PDF and we discovered a useful "Complete Report" tool that creates a PDF with nicely formatted data filtered by date/time.

The Web admin interface displays system overview information similar to the other products we tested, although not as well-organized or graphically appealing. On the plus side, the SSL 560 is a very easy system to manage, both from an admin standpoint and from the client standpoint. We referred to the context-sensitive help section only once or twice and, unlike our experience with a couple of other products, we did not need to contact technical support to clear hurdles.

Barracuda SSL VPN 380

The initial configuration of the Barracuda

SSL VPN 380 can be completed directly from a console on the appliance or through a Web interface. We elected to use the console to initially configure the IP settings and then switched over to the Web admin interface. The appliance has a built-in user database which we used for testing, but the Barracuda SSL VPN 380 can also link dynamically to external user data directories such as LDAP, Open LDAP and Active Directory. The ability to utilize external user directories is important in production environments.

The Web admin interface has an appealing look and the status screen displays a number of useful parameters ranging from CPU fan speed and temperature to the number of users and session types. Most of the functionality is easy to locate using helpful tabs for each category.

There are also sub-tabs that quickly point you in the correct direction when configuring the appliance. Another handy feature is the messaging at the top of each screen that alerts users to items that need attention, such as unsaved settings. The same message area also alerts administrators each time an item is changed and saved.

Creating user accounts is a straightforward process using a single-screen dialog with just a few parameters, such as username, password and email address. You can also optionally assign users to groups.

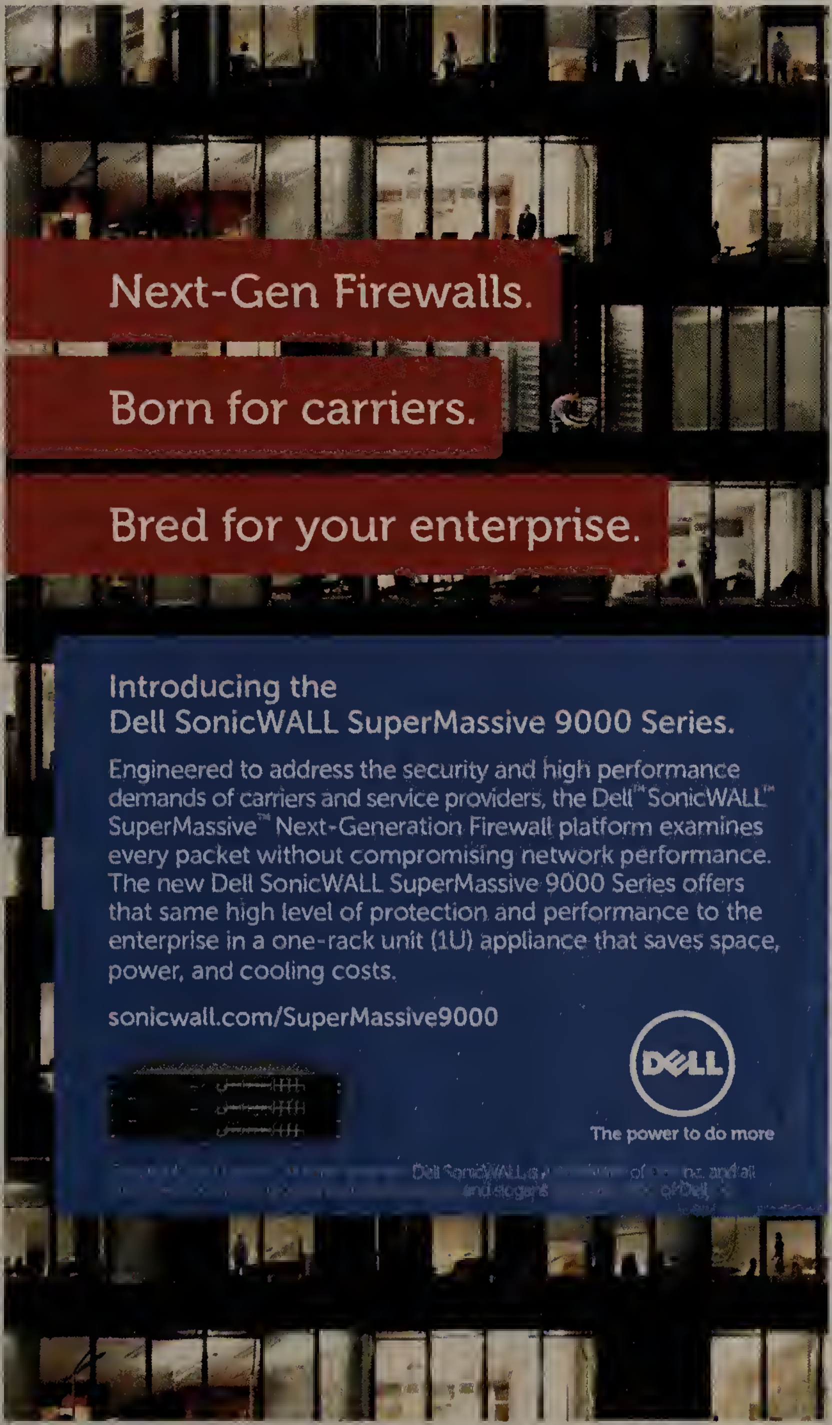
After creating test users we configured several common network resources that could be remotely accessed from the client portal. The Barracuda SSL VPN 380 offers a number of choices for resource types, ranging from Web forwards and network places to applications and tunnel resources. Each resource can be configured from a single screen.

While wizards are always a nice touch for beginners, a single-screen configuration is an important feature for busy administrators. At the bottom of each configuration screen is a list of existing resources for that category. One change we would find helpful would be to color-code the active tabs in a way that would easily identify the task at hand, versus shades of blue that were sometimes a bit confusing.

We created and configured several resources (SSL tunnel, RDP and a Web application) before switching to the Web client portal where, after logging in, our previously configured resources were displayed as icons. The client portal consists of the login screen, a help section and the ability for the client to update some system information.

For mobile access, the Barracuda SSL VPN allows devices secure access to the network by using the VPN protocol native to the device (iOS, Android, Windows Mobile).

We found the logging capability of the Barracuda SSL VPN 380 to be adequate, but not as full-featured as some of the other products we tested. The Barracuda SSL VPN 380 does have a very good reporting module with the ability to add parameters and export capabilities to multiple formats.



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The unit also ships with built-in endpoint controls that can validate against certain criteria before allowing the connection. Items that can be evaluated include OS and browser versions, antivirus capability and whether an OS is up-to-date.

Dell SonicWall EX7000

SonicWall was acquired by Dell in 2012, and Dell is now in the process of becoming a privately held entity, but at least for now it appears the company is keeping the SonicWall name for this line of Internet appliances. Our test appliance was a Dell SonicWall EX7000.

The initial setup of IP and DNS settings was done using the display and buttons found on the front of the appliance. After the initial setup, we connected the appliance to the test network and completed the remaining configuration tasks from the Web admin interface. The Aventail Management Console is efficient and easy to navigate, with the initial dashboard displaying key information in an easy-to-read format. We liked the checklist that shows any pending items needing attention with the ability to drill down for details.

There are three main client access methods available: network tunnel client, Web proxy agent and client/server proxy agent. End users can connect remotely using methods such as a connect tunnel client, connect mobile client and on-demand tunnel agent.

However, the main access point is the Aventail WorkPlace portal, which provides access to Web-based resources. We especially liked the ability to customize the portal for different audiences, such as associates or customers. The Dell SonicWall EX7000 supports the Mobile Connect client on iOS and Android devices, as well as most mobile browsers.

Users can be authenticated against

network repositories such as Active Directory, LDAP and RADIUS, through a single sign-on server or using a local database. The SonicWall appliance uses "realms" to tie together authentication, resource access, user management and endpoint control. This is visually displayed in flowchart-like display from the Admin interface, making it easy to see what is currently configured, with the option of managing each item from one location.

Similar to other appliances we tested, the Dell SonicWall EX7000 uses rules for access control. We liked the way rules are enforced — once a client requests access, the rules are evaluated in order of precedence, and once a matching rule is found, the appropriate action is applied. If no matching rule is found, access is denied. Access rules are tied to available configured resources such as file shares, RDP access, applications, Web resources or host.

We found that the Dell SonicWall EX7000 had robust endpoint configuration capabilities, allowing us to ensure that clients connecting to the network met our configuration prerequisites, such as operating system and antivirus protection, or even more granular requirements such as matching equipment IDs or client certificates.

Although the SonicWall does not offer direct reporting from the admin interface, the logging features of the appliance are robust and they can be offloaded to a separate application called Aventail Advanced Reporting (AAR), which is built on the Sawmill log parsing/analysis application. The AAR allows administrators to drill down and query the logs to show specific user and application access information over any date/time range.

The admin interface is easy to navigate and setting up rules and resources is quick and intuitive. However, one thing that was a minor irritation was that we kept forgetting to hit the (required) "pending changes" link to apply our changes. The location of the link is not very intuitive.

The Dell SonicWall EX7000 was a very capable appliance with all the features needed to meet demanding remote connectivity requirements. However, it was hard to avoid noticing the $70,000 price tag on our appliance (configured with all the bells and whistles for 1,000 users with one year of high-priority, 24/7 support).

F5 Networks BIG-IP Edge Gateway 3900 Platform

The F5 BIG-IP appliance can be configured either via command line or through a browser-based Web admin system. We switched to the Web admin interface after assigning the initial IP address using the front-end display and buttons. The admin interface is full-featured, but somewhat imposing for a first-time user. We chalk this up to the additional capabilities of this appliance beyond SSL VPN.

Users can be authenticated using a variety of methods such as RADIUS, LDAP, Active Directory and Kerberos. Creating a link to an authentication server was straightforward using a single-screen configuration. The left navigation on the Admin interface is well-engineered, consisting of three tabs, one each for navigation, context-sensitive help and about, with the about tab providing access to a variety of resources.

What we found a bit cumbersome with the F5 was making sure we had all the prerequisites in place in order to create a client resource. However, after a bit of trial and error and with assistance from the help resource and technical support, we were finally able to create the access policies and a public interface from which clients could access the network.

The F5 BIG-IP client is available for Windows, Mac and Linux, in addition to Windows Mobile 5.0 or higher. For iOS and Android devices there are two different apps available, the Edge Portal and the Edge Client. The Edge Portal app provides access to internal Web apps such as intranets and Microsoft SharePoint; the Edge Client app offers the same capabilities with the addition of the ability to create an optimized SSL VPN tunnel to a corporate network.

We installed the Windows desktop version and were impressed with the ease of use and how quickly it allowed us to change our destination point from one server to another. Once connected to the VPN, we were able to access and utilize network resources such as file shares and applications. The client app displays useful information about connection details and compression ratios.

We especially liked the F5 reporting capabilities. These were the best of all the products tested and include a number of built-in reports, such as ACL summaries, browser distribution and various session reports. There is also a report builder that can create custom reports using flexible parameters, operators and constraints. Another great feature is the modern-looking dashboard that gives administrators a single-screen view showing multiple values, including the current status with a timeline of current and previous connections by type. Several of the values are displayed in speedometer-style gauges that are sure to appeal to administrators.

F5 Networks says the BIG-IP Edge Gateway 3900 acceleration feature allows remote connections 10 times faster than without acceleration, supporting up to 600 logins per second and 600 concurrent users. While we didn't independently verify these impressive-sounding numbers, acceleration sets the BIG-IP Edge Gateway 3900 apart from the other products we tested and may make this product especially appealing in demanding environments requiring very high throughput.

Cisco ASA 5515-X

The ASA 5515-X from Cisco is a 1U rack-mountable unit with administration options via browser-based or command-line interface. There is a lot to like about the Cisco ASDM interface, with the dashboard providing a

NETRESULTS

Product	WatchGuard SSL 560	Barracuda SSL VPN 380	Dell SonicWall EX7000	F5 Networks BIG-IP Edge Gateway	Cisco ASA 5515-X
Pros	Easy to set up and manage, ready out of the box	Excellent admin and client interface, easy to create rules	Endpoint control, easy to create/ enforce rules	Scalability, throughput, rich feature set	AnyConnect client, Web admin wizards, admin dashboard
Cons	No dynamic directory feature, dated interface	Color coding on alerts somewhat hard to read	Full reporting requires module	Admin interface not particularly intuitive	Too many menu choices
Price	$9,150 for 250 users	$2,498 for 50 users	$72,000 for 1,000 users, 1 year of support	$34,995 for 1,000 users	Starts at $795 for 25 simultaneous connections

good status overview of parameters such as current VPN sessions, resources and traffic.

One big plus from an admin perspective was the context-sensitive help topics provided throughout as we were creating policies and configuring the appliance. One aspect of the help feature we found beneficial was the available links that allow you to navigate directly to the applicable area from which you can perform certain tasks. There are also a number of helpful wizards available to walk administrators through various tasks.

The ASA is optimized for use with the Cisco AnyConnect client, and although we performed a few client-less (browser-only) connections, most of our testing was completed using the AnyConnect client from both stationary and mobile clients. The AnyConnect client is typically installed from a browser session to the ASA or it can be manually installed on the client or using various login scripts.

In addition to running on most desktop operating systems, AnyConnect is available for mobile on iOS and Android, and according to Cisco it will be available for Windows Mobile soon. Data can be protected by using either an SSL or IPSec tunnel; however, the SSL tunnel is only available when using the AnyConnect client.

Authentication can be accomplished against one or more external directories or using a built-in database. Setting up local users is quick through a wizard-like interface that allows you to go with the basics or expand into more advanced settings. All connections are made using client and connection profiles, which can also inherit settings from group policies. This provides for great granularity in how access is provisioned, but can be time-consuming when configuring the unit for the first time.

That being said, many settings use defaults that most users would probably use, and the built-in wizards are a great resource if you need to get something up and running quickly. This is how we created our first few policies and got up and running in a few minutes.

Similar to the other products we tested, the Dynamic Access Policy feature allows administrators to validate endpoint criteria before access is granted. We especially liked the ability to test a dynamic access policy on the fly before saving it.

Once the client is installed, it can be accessed from a shortcut on the desktop or from a browser window. The client software is available for most operating systems and we tested it both on Windows 7 and an iOS mobile device without any issues.

The logging and reporting capabilities of the ASDM software are very good and the real-time access to the SysLog affords administrators the ability to closely observe traffic patterns and take corrective measures as needed. We would not recommend this appliance to newbies, but accomplished system administrators looking for raw power and the ultimate control over remote connections will definitely want to consider the Cisco ASA 5515-X security appliance. ■

Perschke is CSO for Arc Seven Technology. She is also an experienced technical writer. Susan can be reached at susan@arcseven.com.

Network World's forum on LinkedIn is the place for network and IT professionals to offer each other advice and discuss the networking news of the day. Network World editors are on hand to ensure that the group remains free of spam and vendor spin, and to give their take on what's important in networking. Occasionally, they'll poll the group on controversial issues and you can make your voice heard.

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NETWORKWORLD

How IT needs to get ready for the next wave of connected devices

WRITTEN BY BOB VIOLINO

ILLUSTRATION BY RICHARD DOWNS

THE Internet OF Things

WHEN PEOPLE TALK ABOUT THE INTERNET OF THINGS (IoT), the most common examples are smart cars, IP-addressable washing machines and Internet-connected nanny cams.

But IoT is coming to the enterprise as well, and IT execs should already be thinking about the ways that IoT will shake up the corporate network.

"Products and services which were previously outside their domain will increasingly be under their jurisdiction," says Daniel Castro, senior analyst with the Information Technology and Innovation Foundation, a Washington-based research and educational institute.

So, what are these devices?

Castro says that companies increasingly will be operating in "smart buildings" with advanced HVAC systems that are connected to the rest of the corporate network.

Many utility companies will be deploying Web-connected smart meters at customers' facilities to allow for remote monitoring.

Companies are tying their physical security to their network security, so that data from security cameras and authentication readers are coming under the purview of enterprise IT.

Retailers such as Walmart, Target and Best Buy already use RFID and other tracking technologies to manage supply chain logistics, says IDC's Michael Fauscette. IoT is a natural next step.

Then there's "operational technology," where enterprise assets such as manufacturing equipment, fleet trucks, rail cars and even patient monitoring equipment in hospitals become networked devices, says Hung LeHong, research vice president at Gartner.

"Those types of assets are becoming Internet-enabled," LeHong says. And even though they are managed by field operations or hospital services, he says, they could become endpoints on the corporate network, just like smartphones and tablets.

Other examples of operational technology might include companies deploying vending machines that are connected to the Internet, so that they can be automatically restocked when certain items run low. "These assets are becoming part of the online world, and they could now be on the enterprise network," LeHong says.

Another key area where IoT is making an appearance is in what Gartner calls the digital supply chain. That's when a company's end products, such as consumer electronics or large machinery, are Internet-enabled so that the manufacturer can keep track of things such as maintenance schedules.

"The digital supply chain continues after you deliver the physical product," LeHong says. A growing number of the more expensive assets and products that are arriving on the market will have this capability, he says.

Another place where IoT is showing up is in consumer offerings such as home automation and the smart grid. IT executives in industries such as gas and electric utilities will need to stay abreast of developments such as how smart meters and other types of data-generating solutions will affect IT and the corporate network.

And finally, IoT is emerging in so-called smart cities, where all kinds of devices and assets such as traffic lights, parking meters and garbage truck fleets are gradually being connected to the Internet. Municipal government IT executives will need to be aware of how these assets tie in to the network.

IT and OT convergence

What will likely happen is a convergence of operational technology and IT. "As these machines go onto the corporate network the CIO and the COO need to start talking together about what the future is going to look like when traditional IT stuff and OT stuff are overlapping on the network," LeHong says.

"Who is responsible for providing security, for example," LeHong says. "There are skill sets that exist in IT that are very developed, but that are new or not a prime focus for the operations guy. There can be some synergies."

IT executives will need to prepare themselves for situations such as when an IP-based vending machine is creating software replenishment orders for out-of-stock items using an enterprise resource planning application, LeHong says.

"When it creates the replenishment order, does the vending machine need a user license" for the ERP application? LeHong says. "CIOs need to get an understanding of this. Even if they are not going to own the vending machines, they need to worry about things like that. That's what we mean by convergence. OT and IT can't sit in separate worlds anymore. They need to discuss things like governance, security, software licensing and maintenance."

In terms of networking technology and strategies at enterprises, IoT will have a significant impact. According to a report on IoT trends published by Gartner in 2012, things will be connected, but not necessarily in the ways most familiar to companies today.

"Wi-Fi, 3G/4G cellular and Bluetooth are the wireless connectivity technologies we are most familiar with; however, they will not be the only way things connect to the Internet," the report states.

These network technologies and protocols consume lots of power and are designed for higher-bandwidth applications, the firm says, but many things (for example, a temperature/humidity sensor in a remote agricultural setting) will require low bandwidth, long range and very low power consumption.

In addition, things will need to be addressable. Every computer, smartphone and tablet is addressable, directly or indirectly via IP, the Gartner report says, and "it follows that things will also need to be addressable so they can communicate with other things, applications and people on the Internet."

While not every "thing" will have an IP address, it will need to be addressable.

Big data

Then there are the data management issues. Getting the most value out of IoT requires an ability to manage data and gain insight from analyzing that data, Gartner says.

If everything has the potential to provide some type of data stream, companies will need technologies to manage, store and analyze the data. While some organizations might be able to leverage existing information management tools, many will need to bring in new technologies designed to handle the real-time and large-scale nature of the IoT.

Recent IT trends such as the move to the cloud and implementations of big data and analytics will likely come into play with the IoT, experts say.

"Are you going to procure cloud services for hooking up these things to the corporate network?" LeHong says. "And it's not just questions about the cloud, but about endpoint management and architecture. Let's say you have a jet engine or a pump in an oil field that can produce a terabyte of information per day. That's a lot of data."

From an architectural standpoint, IT and operations will need to decide whether to store that data on-site, in the cloud or in a corporate data store.

Looking ahead to the next few years, growth of the IoT will probably be greatest in areas such as inventory tracking and supply chain management, Castro says. But given the way technology is developing, it's likely that the IoT will be pervasive in many aspects of business. ■

Violino is a freelance writer. He can be reached at bviolino@optonline.net.

What is the INTERNET of Things?

Chances are you've heard about the Internet of Things (IoT) — or you will soon enough. The term carries a number of definitions. But in general, the IoT refers to uniquely identifiable objects, such as corporate assets or consumer goods, and their virtual representations in an Internet-like structure.

The idea of the IoT first became popular through the Auto-ID Center, a non-profit collaboration of private companies and academic institutions that pioneered the development of a Web-like infrastructure for tracking goods around the world through the use of radio frequency identification (RFID) tags carrying Electronic Product Codes.

The center closed operations in 2003 and EPCglobal was created to continue the effort to commercialize EPC technology, and the center's research is carried on today by Auto-ID Labs at various universities worldwide.

While RFID is often seen as a prerequisite for the IoT, the concept includes Web-enabling virtually any type of product or machinery so that data about the object can be captured and communicated.

In effect, these networked things become "smart objects" that can become part of the Internet and active participants in business processes.

Current or potential examples of the IoT include a vast array of objects: fleets of trucks, medical equipment, vending machines, construction equipment, gas and electric meters, thermostats, household appliances, advertising display signs and many others.

How tangible is the IoT today?

"It's definitely real," says Daniel Castro, senior analyst with the Information Technology and Innovation Foundation, a Washington-based research and educational institute. "The IoT is taking off because we have ubiquitous connectivity, low-cost sensors and microelectronics that allow almost anything to be connected to the Internet."

The concept used to be foreign to many, "and trying to explain how 'things' could be part of the Internet took quite a bit of imagination," Castro says. "But now consumers are used to seeing this every day."

For example, Castro says, Zipcar lets people rent a car by the hour, but this is only possible because the car's usage and reservation system is tracked online.

"Redbox lets you do the same thing for DVDs," he says. "There are other examples from smart meters for electricity, to parking meters that you can pay for online, to augmented reality using mobile phones that all are starting to combine the physical with the virtual."

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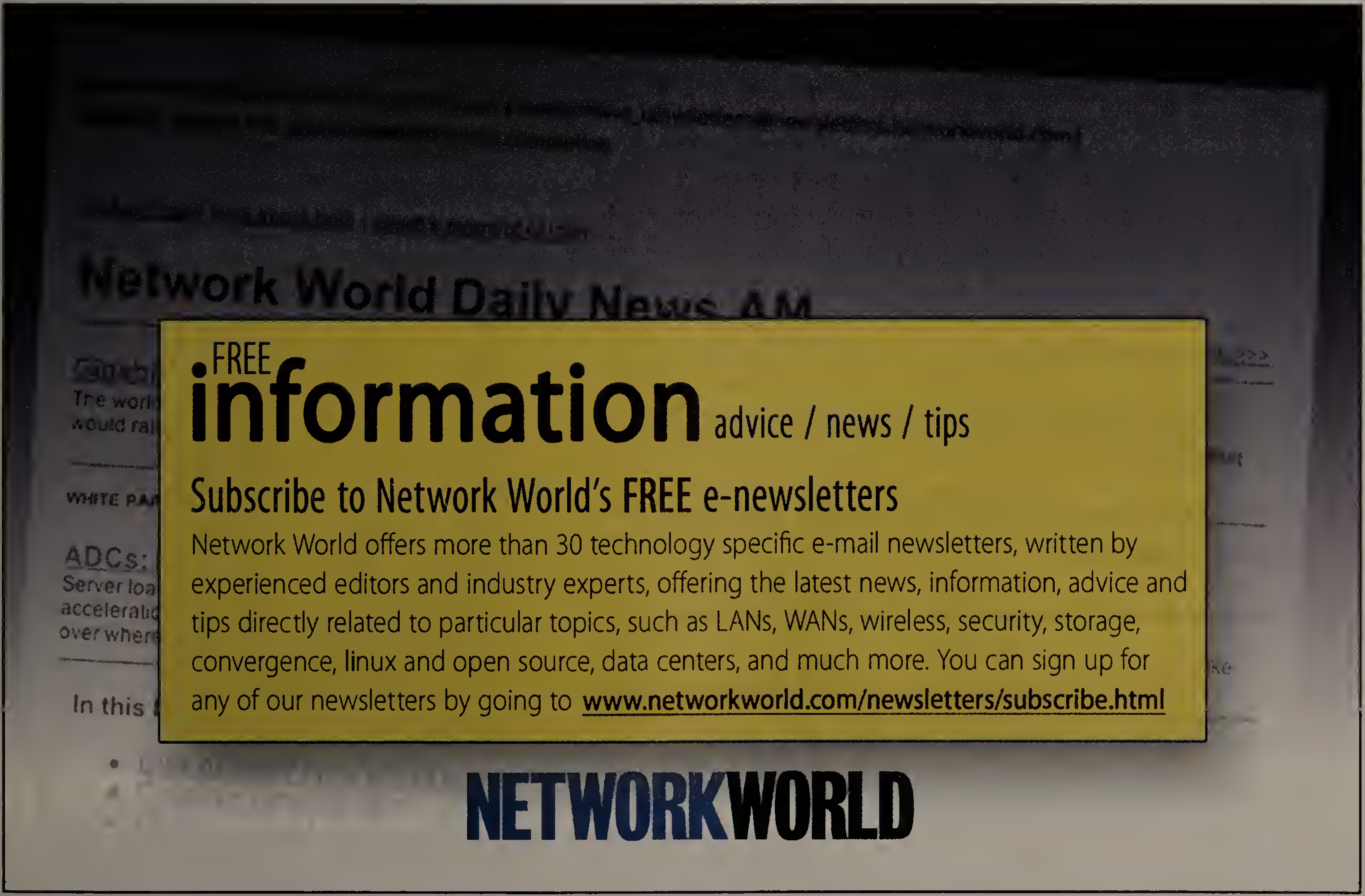

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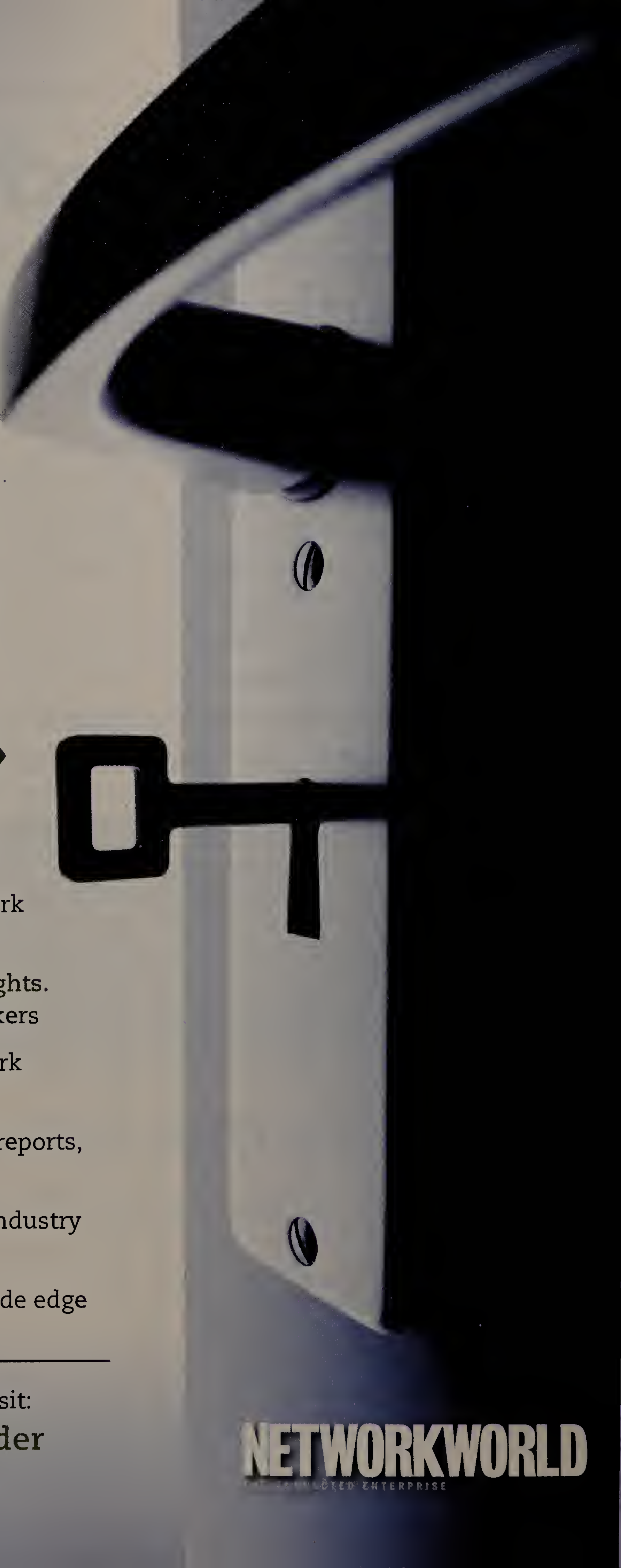

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BACKSPIN | BY MARK GIBBS

Indirectly connected to the Internet of Things

IF "CLOUD" is the biggest topic out there, then the Internet of Things (IoT) is probably a close second (witness the cover story in this issue).

There are two types of connections that things — stuff other than computers — use to connect to the Internet: direct, where the thing can either talk as a client to whatever remote online application it interfaces with or where it can be seen online as a server, and indirect, where communication to the IoT is mediated by some method other than IP.

A great example of the latter is SquareTag, from Kynetx.

SquareTag sells tags: simply a QR code printed on various labels such as luggage tags, key ring tags and adhesive aluminum plates. You attach these tags to something and then configure an "app" on the SquareTag server to be the online proxy for that thing.

The simplest use of a proxy app is to identify something you own ... your stuff. For example, you might put a SquareTag on your suitcase or an aluminum tag on your bicycle frame.

If that thing should get lost and someone finding it is smart enough to scan the QR code, it will bring up a Web page displaying your contact information and, if the lost thing (or, more likely, stolen thing) is your £25,000 Factor Aston Martin One-77 Cycle (they're only making 77 of these), you'll most likely be offering a reward. A large one.

Where this concept gets really interesting and novel is when the apps become more sophisticated. For example the bicycle app could record the geolocation of the device accessing the URL associated with the tag and or generate a text message to you.

Imagine if this technology was a standard on bicycles! It could act not only as a way of identifying your property but also be part of the buying and selling of bikes. The seller would simply go into the proxy app for the bike and assign it to the buyer.

What's so important about this concept of a proxy for things is that it allows for the inclusion of things that can't easily or cost-effectively be connected by "smart" devices.

For example, adding instrumentation to your 1981 DeLorean DMC-12 so you can track fuel consumption is not something most people would attempt, but using the SquareTag system you'd simply stick a tag on your fuel cap and scan it when you put fuel in your car.

On the SquareTag site there's an app you can associate with that QR code called STFuel and when scanned on your smartphone, a form will be automatically loaded. This form is specifically for recording fuel usage data for that particular vehicle. You enter the price, gallons and odometer reading, and the app stores the record. When you access the app online it can analyze the data and draw a graph for your fuel usage.

This indirect communication-based proxy technology is a powerful idea that's quite simple to implement to expand the Internet of Things.

But what about the direct communications-based devices? The problem is that many of the products that are in this class of the Internet of Things simply ... what's the technical term? ... oh yeah, suck. The problem is that in the process of "thingifying" them designers seem to be forgetting that the Internet isn't reliable, isn't always available, and that performance matters. We will discuss this next week ... ■

Gibbs is directly connected in Ventura, Calif. Try connecting yourself to gearhead@gibbs.com.

NETBUZZ | BY PAUL MCNAMARA

IT pro has a hair-raising hobby

BY DAY Chad Roberts, 35, is a Windows Server and Exchange administrator for Berkshire Hathaway Media Group. For play he's an award-winning competitive beardsmith and founder of the RVA Beard League in Richmond, Va. We chatted by email.

What is it with techies and beards?

"I think since a lot of IT guys are behind the scenes, back in the server room, or off in some corner, the cultural expectations are different from, say, that of the sales staff who are a public face of the company and need to appeal to the absolute maximum number of potential clients. In IT, it's more about knowledge, results and ability, than your choice of hair style."

That being said, wearing a great beard is a tremendous ice breaker. I think you'll find that most guys with beards are friendly and social (perhaps with the exception of Walter Peck from "Ghostbusters").

How did you get into competitive bearding?

"I helped start our own group here in Richmond in the summer of 2011 and the Beard Team USA National Championships were being held up in Lancaster, Pa., a few months later. So a group of five of us carpooled up for our very first competition and jumped right in the deep end. I didn't even make it to the semifinals, but the response of the people in the crowd was overwhelmingly positive, so I kept at it."

Without compromising competitive secrets, are you able to tell me what technologies are important to your success? (There's always a technology angle.)

"Since I compete in the Freestyle category (and like troubleshooting systems), thinking creatively is the name of the game, but it's hard to implement a plan or design without the right tools. Extra-strength hair spray (better living through chemistry) works the best for most applications. It's usually light and strong enough for what I need, and a hair dryer is crucial for setting the design in place."

I see you're a Windows Server and Exchange administrator. When you're working on a balky machine, how do you manage to keep all that beard from getting in the way?

"Day to day having a big beard is no problem. If I need to open up a server and take a look inside, I'll just tuck my beard into my dress shirt between the buttons, like a tie at a luncheon. It stays put and out of the way."

What are the similarities between competitive bearding and IT work?

"Like any good IT shop, there's a level of maintenance involved with competitive bearding. Just as you need to run and test your backups regularly and keep a watchful eye on the server logs, diligence is required to keep a beard or mustache performing at its best. A regimen of conditioning and overall good health keep your facial hair growing well and looking good. The GIGO principle works here too."

You can check out a slideshow of his greatest beard hits at tinyurl.com/cflfl6. ■

Absolutely, you can send me your own beard pics if you want. The address is buzz@nww.com.

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